

*Peterson 18**Serial No. 09/915,963*

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8 wherein the at least one antenna element comprises a traveling wave antenna supporting a  
9 phase velocity greater than the speed of light and, wherein the antenna structure supports  
10 a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional  
11 three-dimensional beam pattern.

1 5. (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2 at least one antenna element is positioned at an angle from the symmetrical ground plane.

1 6. (Original) The antenna structure of Claim 5, wherein the angle is about 90  
2 degrees with respect to the x-, y- and z- axes.

1 7. (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2 at least one antenna element is coupled with the symmetrical ground plane by means of an  
3 unbalanced impedance.

1 8. (Original) The antenna structure of Claim 7, wherein the unbalanced  
2 impedance comprises a coaxial cable.

1 9. (Original) The antenna structure of Claim 7, wherein a first conductor of  
2 the unbalanced impedance mechanically couples the at least one antenna element with the  
3 symmetrical ground plane.

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1           **10. (Previously Presented)** The antenna structure of Claims 3 or 4, wherein the  
2   symmetrical ground plane is disk shaped.

1                    11.      (Canceled)

1                    **12.      (Canceled)**

**13.** (Currently Amended) An antenna structure comprising:

an array of at least two antenna elements, each antenna element having at least one taper;

a symmetrical finite ground plane;

and

an unbalanced impedance for coupling the array of at least two antenna elements with the symmetrical ground plane;

wherein at least one antenna element of the array comprises a traveling wave antenna supporting a phase velocity greater than the speed of light and wherein the taper of at least one antenna element of the array comprises a linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile.

1           **14.     (Currently Amended) An antenna structure comprising:**

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3 an array of at least two antenna elements, each antenna element having at least one  
4 taper;

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6 a symmetrical finite ground plane;

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8 and

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10 an unbalanced impedance for coupling the array of at least two antenna elements  
11 with the symmetrical ground plane;

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13 wherein at least one antenna element of the array comprises a traveling wave antenna  
14 supporting a phase velocity greater than the speed of light and wherein each antenna  
15 element of the array supports a cigar-like directional three-dimensional beam pattern and a  
16 butterfly wing-like directional three-dimensional beam pattern.

1 15. (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2 each antenna element of the array is positioned at an angle from the symmetrical ground  
3 plane.

1 16. (Original) The antenna structure of Claim 15, wherein the angle for each  
2 antenna element is about 90 degrees with respect to the x-, y- and z- axes.

1 17. (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2 the unbalanced impedance comprises a coaxial cable.

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1           **18.**     (Original) The antenna structure of Claim 17, wherein a first conductor of  
2     the unbalanced impedance mechanically couples each antenna element of the array with  
3     the symmetrical ground plane.

1           **19.**     (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2     the symmetrical ground plane is disk shaped.

1           **20.**     (Previously Presented) The antenna structure of Claims 13 or 14, further  
2     comprising a slow wave antenna to widen the directivity of the antenna structure.

1           **21.**     (Canceled)

1           **22.**     (Currently Amended) An apparatus comprising:  
2  
3     a transceiver; and  
4  
5     an antenna structure for radiating or capturing electromagnetic energy from or to  
6     the transceiver comprising:  
7  
8           at least one antenna element having at least one taper, the taper comprising  
9           a linear profile, a linear constant profile, a broken-linear profile, an  
10          exponential profile, an exponential constant profile, a tangential profile, a  
11          step-constant profile, or a parabolic profile;  
12  
13          a symmetrical disk shaped finite ground plane, the at least one antenna element  
14          being positioned at an angle from the symmetrical disk shaped finite ground plane;

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and

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an unbalanced impedance for coupling the at least one antenna element

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with the symmetrical disk shaped finite ground plane;

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wherein the at least one antenna element comprises a traveling wave antenna supporting a

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phase velocity greater than the speed of light and wherein the at least one antenna element

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supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like

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directional three- dimensional beam pattern.

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**23.** (Previously Presented) The antenna structure of Claim 22, wherein the

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angle is about 90 degrees with respect to the x-, y- and z- axes.

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**24.** (Previously Presented) The antenna structure of Claim 22, wherein the

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unbalanced impedance comprises a coaxial cable.

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**25.** (Previously Presented) The antenna structure of Claim 22, wherein a first

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conductor of the unbalanced impedance mechanically couples the at least one antenna

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element with the symmetrical ground plane.

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**26.** (New) The antenna structure of Claim 20, wherein said slow wave antenna

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is positioned at a greater distance from said ground plane than said antenna elements.

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1           **27.**     (New) The antenna structure of Claim **3, 4 or 22**, wherein the distance  
2     between the lower edge of said at least one antenna element and said ground plane is  
3     tapered.

1           **28.**     (New) The antenna structure of Claim **13 or 14**, wherein the distance  
2     between the lower edge of each of said at least two antenna elements and said ground  
3     plane is tapered.